AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1-34 (canceled)

35. (currently amended) A method of detecting a target polynucleotide which comprises the steps of:

a) contacting a target polynucleotide having a first portion and a second portion immediately contiguous to one another with:

i) an invader oligonucleotide, at least a part of which is capable of specifically hybridizing to the first portion of the target polynucleotide;

ii) a first probe oligonucleotide comprising a first region that is capable of specifically hybridizing to the second portion of the target polynucleotide and an unpaired region located adjacent to the first region; and

iii) a reagent that is capable of cleaving to release the unpaired region of the first probe oligonucleotide to produce a cleaved unpaired region when the probe oligonucleotide is hybridized to the second portion of the target polynucleotide and the invader oligonucleotide is hybridized to the first portion of the polynucleotide wherein said reagent comprises a 5' nuclease;

~~under conditions wherein said first probe oligonucleotide is cleaved to produce~~ producing said cleaved unpaired region by cleaving said first probe oligonucleotide, forming a second ~~cleavage structureand wherein a second cleavage structure cleavable by said reagent is formed, said second cleavage structure~~ comprising said cleaved unpaired region and a second probe oligonucleotide~~, wherein said second cleavage structure is formed when~~ by hybridizing said cleaved unpaired region ~~is hybridized~~ to said second probe, or ~~when~~ by hybridizing said cleaved unpaired region and said second probe oligonucleotide ~~are both hybridized~~ to a second target polynucleotide, and ~~wherein~~ generating a cleaved second probe by cleaving said second cleavage structure ~~is cleaved by~~ using the reagent ~~to provide a cleaved second probe~~;

b) detecting the accumulation of the cleaved second probe; and

c) determining whether the cleaved second probe accumulates exponentially over time, wherein said exponential accumulation of the cleaved second probe over time is indicative of the presence of said target nucleic acid.

36-46 (canceled)

47. (previously presented) The method of Claim 35 wherein said detecting the accumulation of the cleaved second probe comprises detection of fluorescence or phosphorescence.

48-61 (canceled)

62. (currently amended) A method for detecting the presence of a target nucleic acid molecule in a sample, comprising:

a) incubating a sample containing a first target nucleic acid with a cleavage agent, a first nucleic acid molecule and a second nucleic acid molecule and forming ~~under conditions wherein~~ a first cleavage structure ~~is formed,~~ said first cleavage structure comprising:

i) ~~a first target nucleic acid,~~ said first target nucleic acid comprising a first region and a second region, said second region upstream of and contiguous to said first region;

ii) [[a]] said first nucleic acid molecule comprising a first portion that is completely complementary the second region of the first target nucleic acid;

iii) [[a]] said second nucleic acid molecule comprising a 3' portion and a 5' portion, wherein said 5' portion is completely complementary to said first region of said first target nucleic acid;

wherein said 5' portion of said second nucleic acid molecule is annealed to said first region of said first target nucleic acid and wherein at least a portion of said first nucleic acid molecule is annealed to said second region of said first target nucleic acid,

b) cleaving said first cleavage structure with a cleavage agent comprising a 5' nuclease, ~~generating so as to generate~~ non-target cleavage product ~~under conditions wherein~~ , and forming a second cleavage structure ~~is formed, said second cleavage structure~~ comprising:

i) said non-target cleavage product;

ii) a probe oligonucleotide;

~~wherein said second cleavage structure is formed when~~ by hybridizing said non-target cleavage product ~~is hybridized~~ to said probe oligonucleotide, or by hybridizing both ~~when~~ said non-target cleavage product and said probe oligonucleotide ~~are both hybridized~~ to a second target nucleic acid,

c) cleaving said second cleavage structure with said cleavage agent, generating ~~so as to generate~~ a cleaved probe, wherein said cleaved probe accumulates at an exponential rate over time, and wherein the accumulation of said cleaved probe at an exponential rate over time indicates the presence of said target nucleic acid in said sample; and

d) detecting said cleaved probe at a plurality of timepoints.

63. (previously presented) The method of Claim 62, wherein said detecting said cleaved probe comprises detection of fluorescence.

64. (previously presented) The method of Claim 62, wherein said detecting said cleaved probe comprises detection of mass.

65. (previously presented) The method of Claim 62, wherein said detecting said cleaved probe comprises detection of fluorescence energy transfer.

66. (previously presented) The method of Claim 62, wherein said detecting said cleaved probe comprises detection selected from the group consisting of detection of radioactivity, luminescence, phosphorescence, fluorescence polarization, and charge.

67. (canceled)

68. (previously presented) The method of Claim 62, wherein said 5' nuclease is thermostable.

69. (previously presented) The method of Claim 68, wherein said thermostable 5' nuclease comprises a 5' nuclease of a DNA polymerase.

70. (previously presented) The method of Claim 69, wherein said DNA polymerase is Taq DNA polymerase.

71. (previously presented) The method of Claim 62, wherein said 3' portion of said second nucleic acid molecule consists of a single nucleotide.

72. (previously presented) The method of Claim 71, wherein said single nucleotide is complementary to said target nucleic acid.

73. (previously presented) The method of Claim 62, wherein a plurality of said first nucleic acid molecule is provided, such that said first nucleic acid molecule is in concentration excess compared to said target nucleic acid.

74. (previously presented) The method of Claim 62, wherein a plurality of said second nucleic acid molecule is provided, such that said second nucleic acid molecule is in concentration excess compared to said target nucleic acid.

75. (previously presented) The method of Claim 62, wherein said target nucleic acid and said second nucleic acid molecule form a duplex, and wherein a plurality of said first nucleic acid

molecule is provided such that said first nucleic acid molecule is in concentration excess compared to said duplex.

76. (canceled)

77. (currently amended) The method of Claim [[76]] 75, wherein said non-target cleavage product from said first nucleic acid molecule is generated in concentration excess compared to said duplex.

78. (previously presented) The method of Claim 68, wherein said thermostable 5' nuclease is a FEN-1 nuclease.

79. (previously presented) The method of Claim 78, wherein said FEN-1 nuclease is a FEN-1 nuclease from an archaebacterial species.

80. (previously presented) The method of Claim 79, wherein said FEN-1 nuclease is selected from the group consisting of *Methanococcus jannaschii* FEN-1 and *Pyrococcus furiosus* FEN-1.

81. (previously presented) The method of Claim 35, wherein said reagent is a thermostable 5' nuclease.

82. (previously presented) The method of Claim 81, wherein said thermostable 5' nuclease is a FEN-1 nuclease.

83. (previously presented) The method of Claim 82, wherein said FEN-1 nuclease is a FEN-1 nuclease from an archaebacterial species.

84. (previously presented) The method of Claim 83, wherein said FEN-1 nuclease is selected from the group consisting of *Methanococcus jannaschii* FEN-1 and *Pyrococcus furiosus* FEN-1.